Designing, Measuring and Modelling a Small-Scale Coil and Stimulation Circuit for Transcranial Magnetic Stimulation

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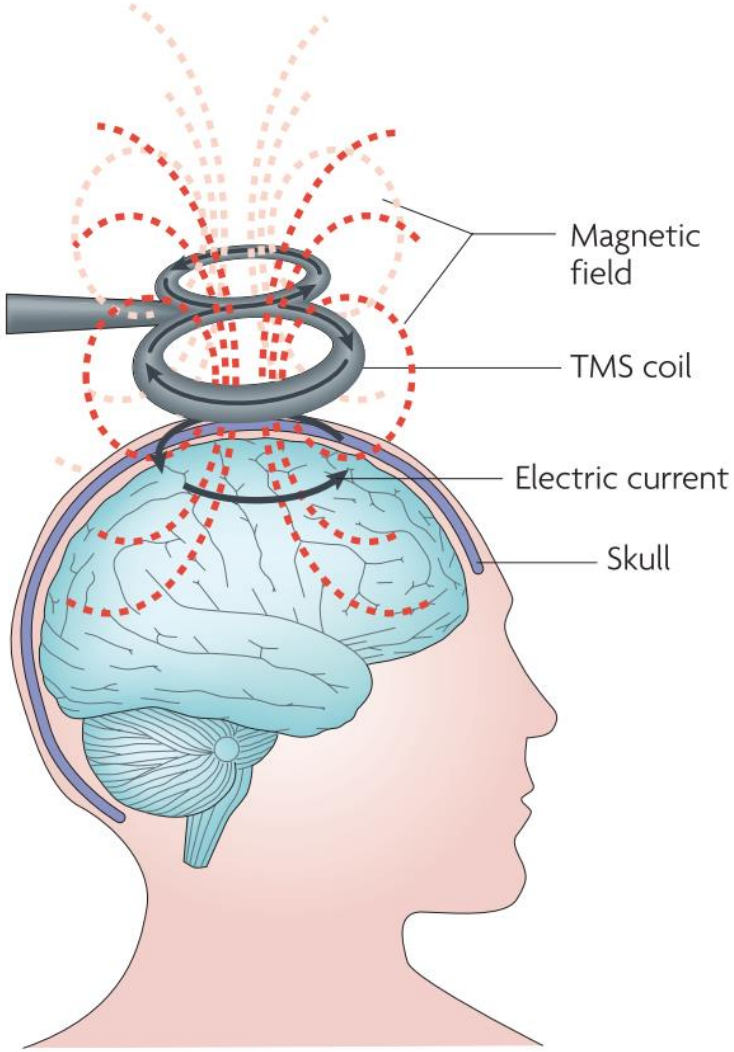

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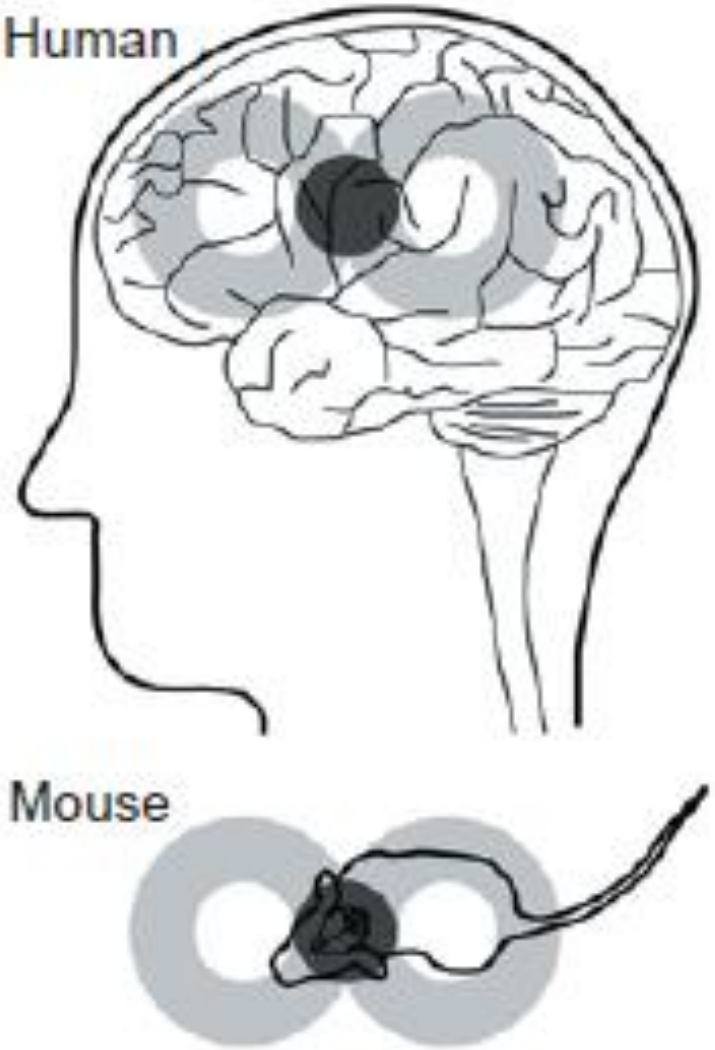

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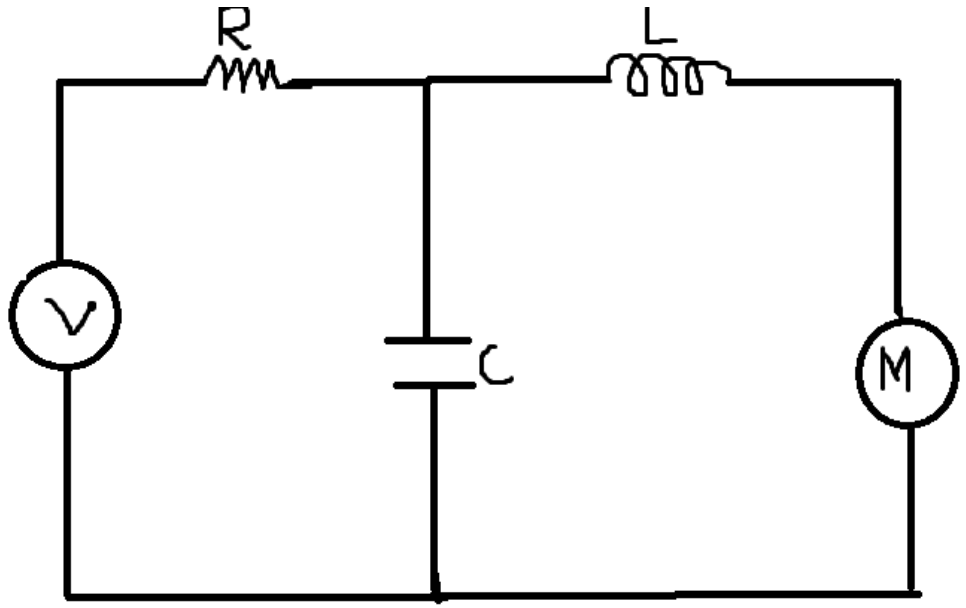
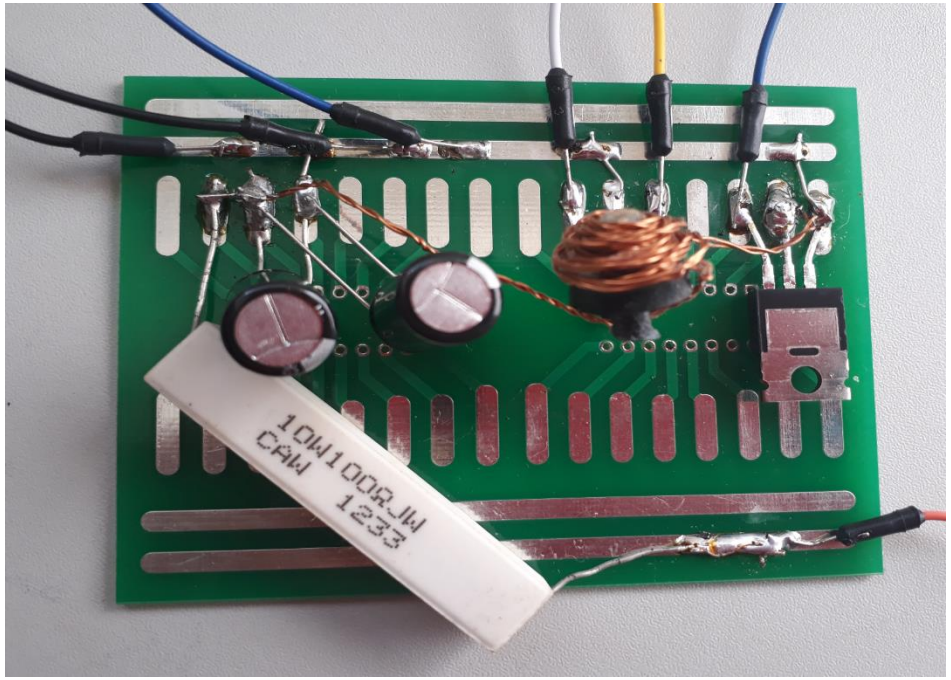
Significance of the Project

- To generate and measure high intensity induced electric field with maximum focality by designing high intensity magnetic mouse-specific TMS coil
- To stimulate the mouse brain slices and measure the excitability in the mouse brain with TMS measurements.

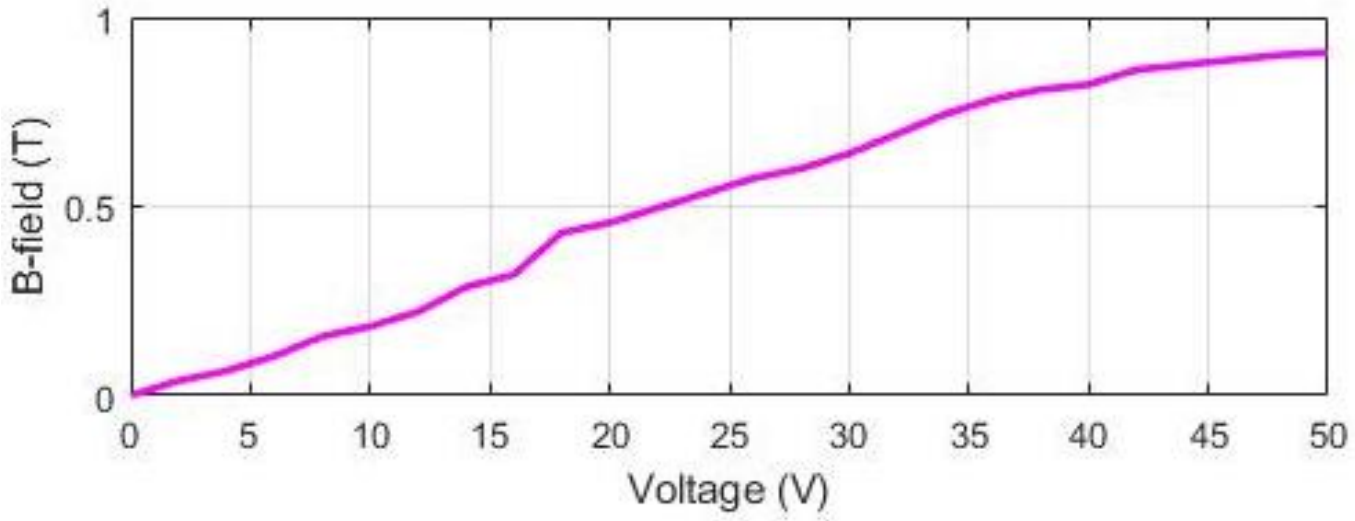
Methodology

- Mouse-specific coil
- Stimulation circuit
- Electromagnetic fields
- Temperature of the coil
- Current flow in the coil

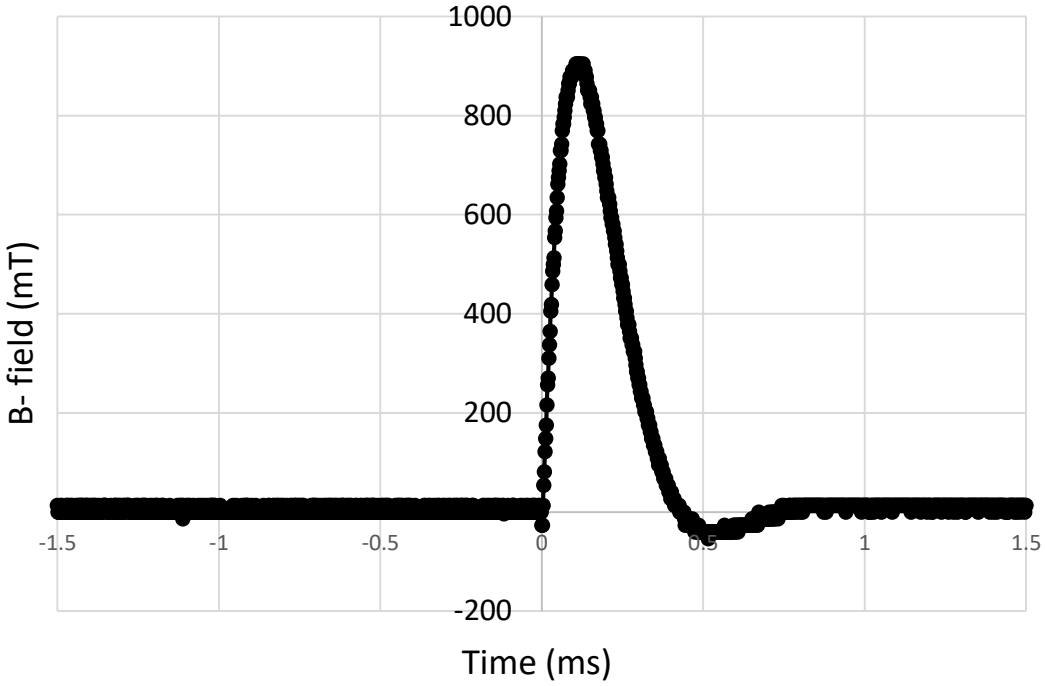




5 mm, 25 turns, Powdered iron core-coil

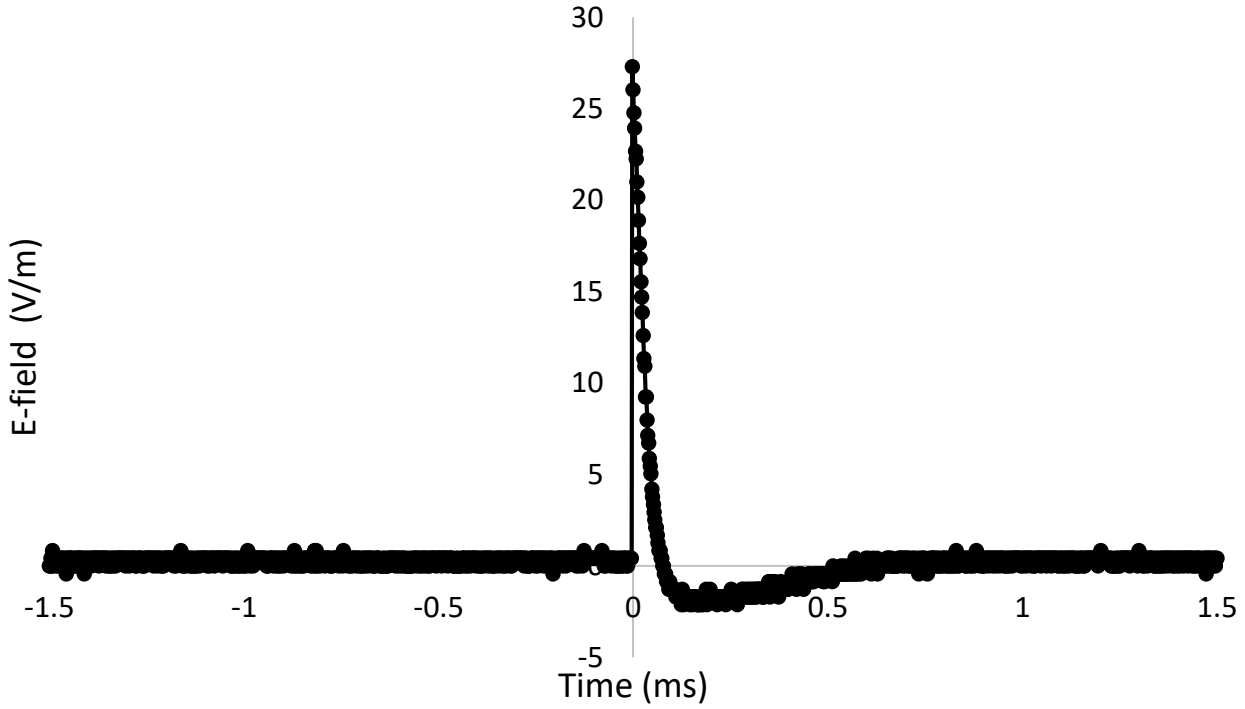


The magnetic flux densities against different voltages of the 25 turns, 5 mm diameter powdered iron core-coil.

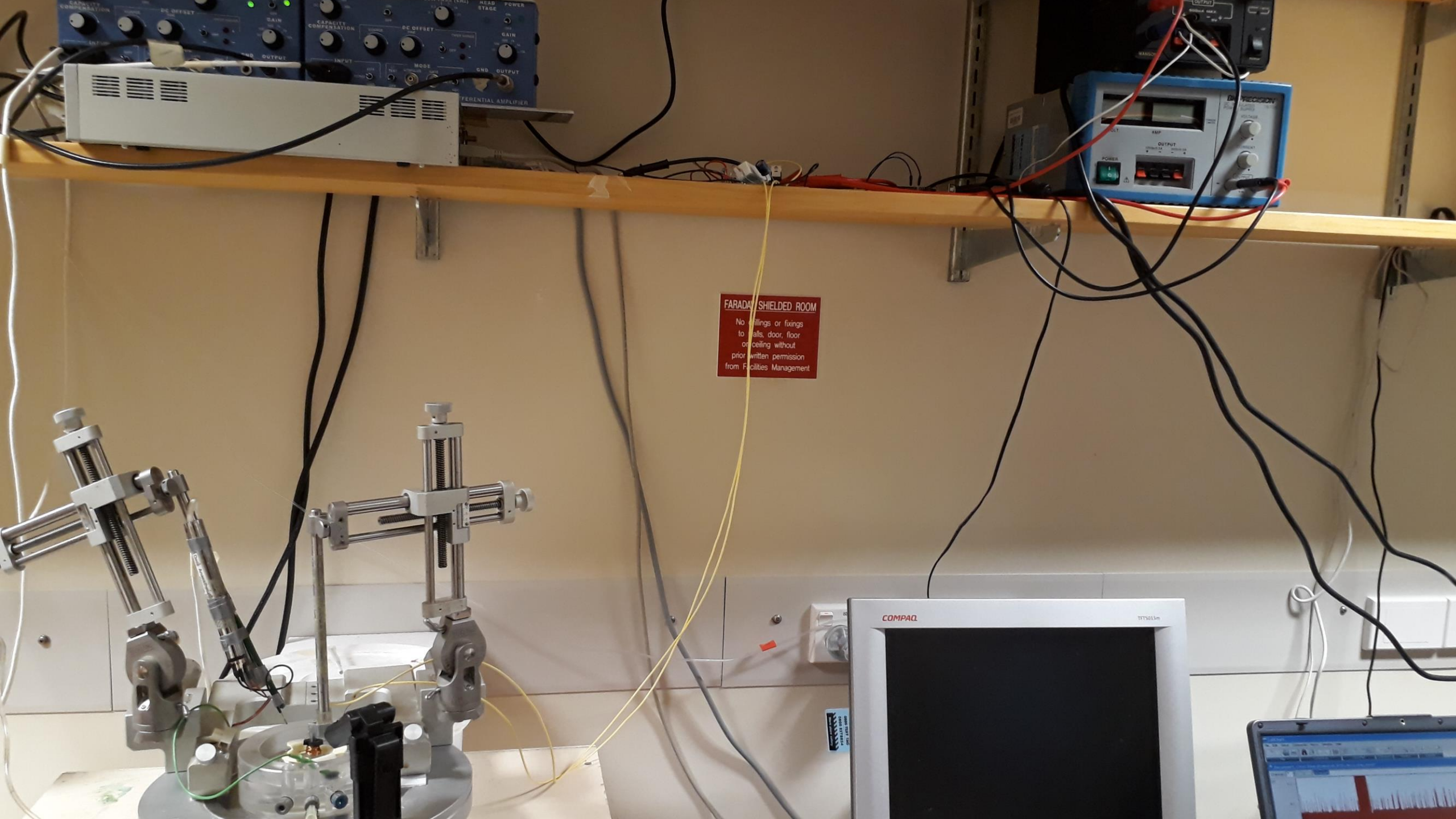


The magnetic flux density of 25-turn 5 mm diameter powdered iron core coil against time for a typical pulse at 50 V.

5 mm, 25 turns, Powdered iron core-coil



The electric field of 25- turn 5 mm diameter powdered iron core coil against time for a typical pulse at 50 V.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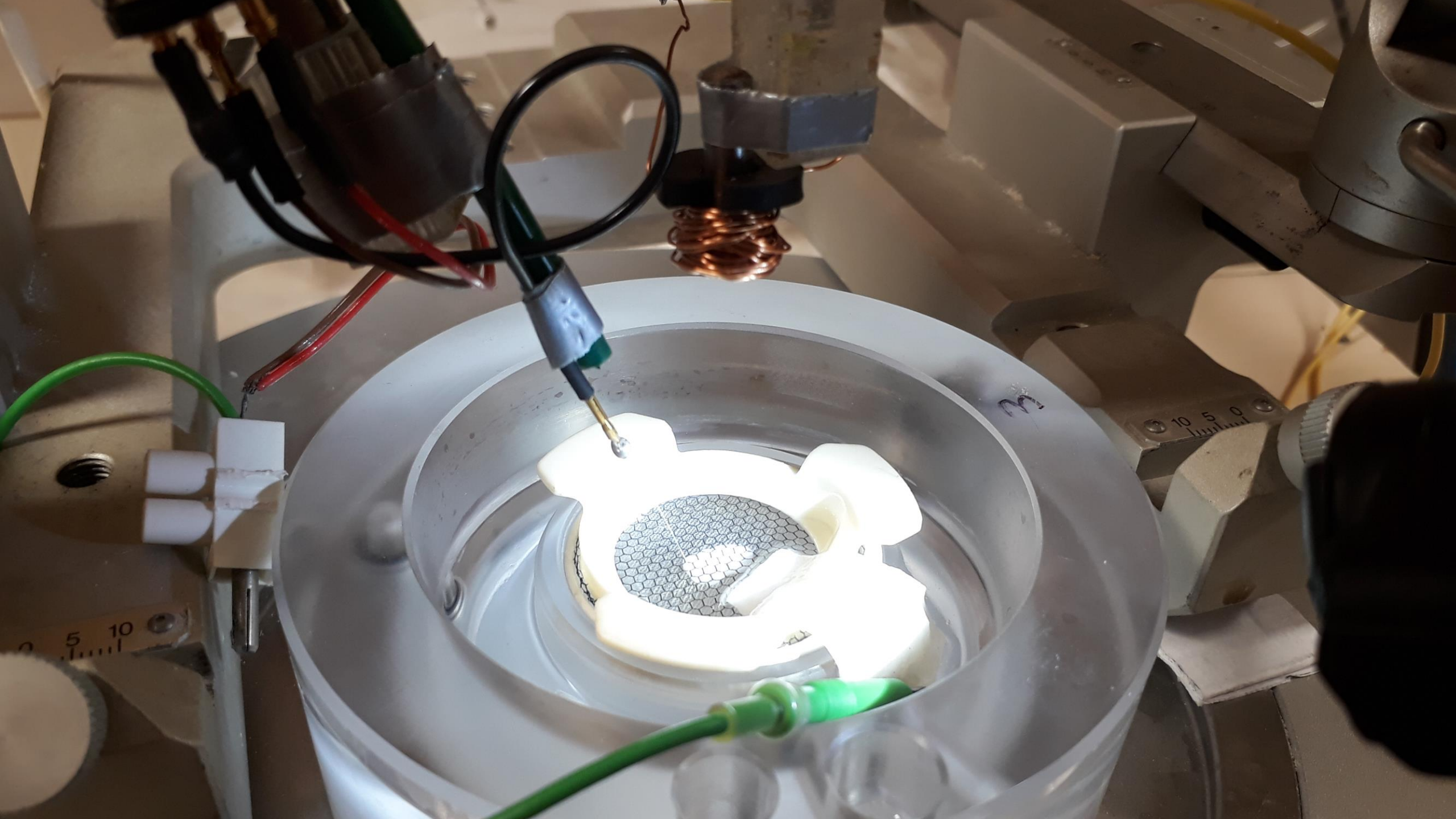

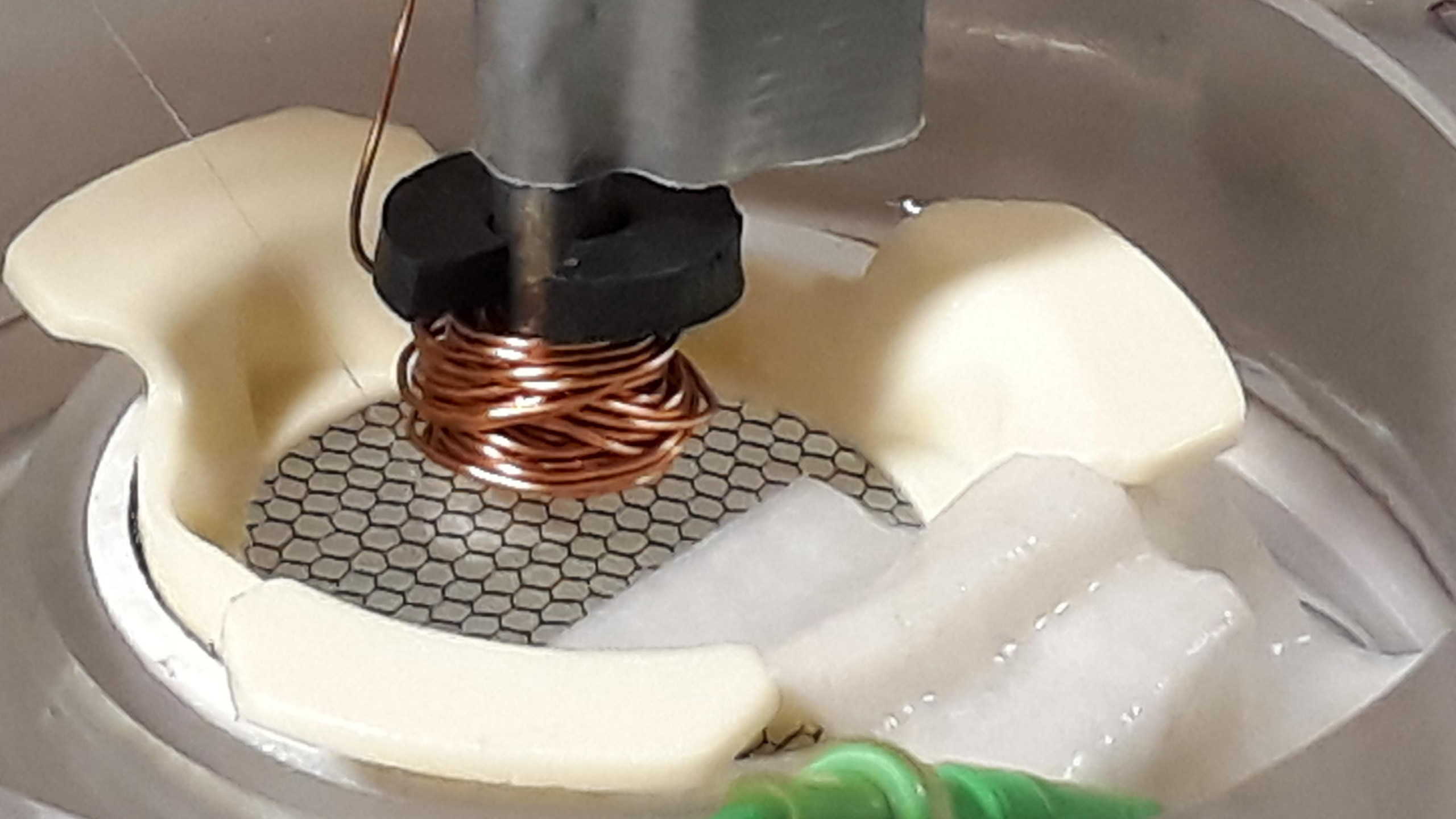

Repeated Measures Analysis of Variance (ANOVA) (Amplitude)

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Amplitude Test Period (0 -10 mins)	Amplitude Control Period (0 – 10 mins)
0.8349	

Amplitude Test Period (10 -20 mins)	Amplitude Control Period (10 – 20 mins)
0.2791	

Amplitude Test Period (20 -30 mins)	Amplitude Control Period (20 – 30 mins)
0.2771	

Repeated Measures Analysis of Variance (ANOVA) (Frequency)

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Frequency Test Period (0 -10 mins)	Frequency Control Period (0 – 10 mins)
0.26.03	

Frequency Test Period (10 -20 mins)	Frequency Control Period (10 – 20 mins)
0.3706	

Frequency Test Period (20 -30 mins)	Frequency Control Period (20 – 30 mins)
0.4525	